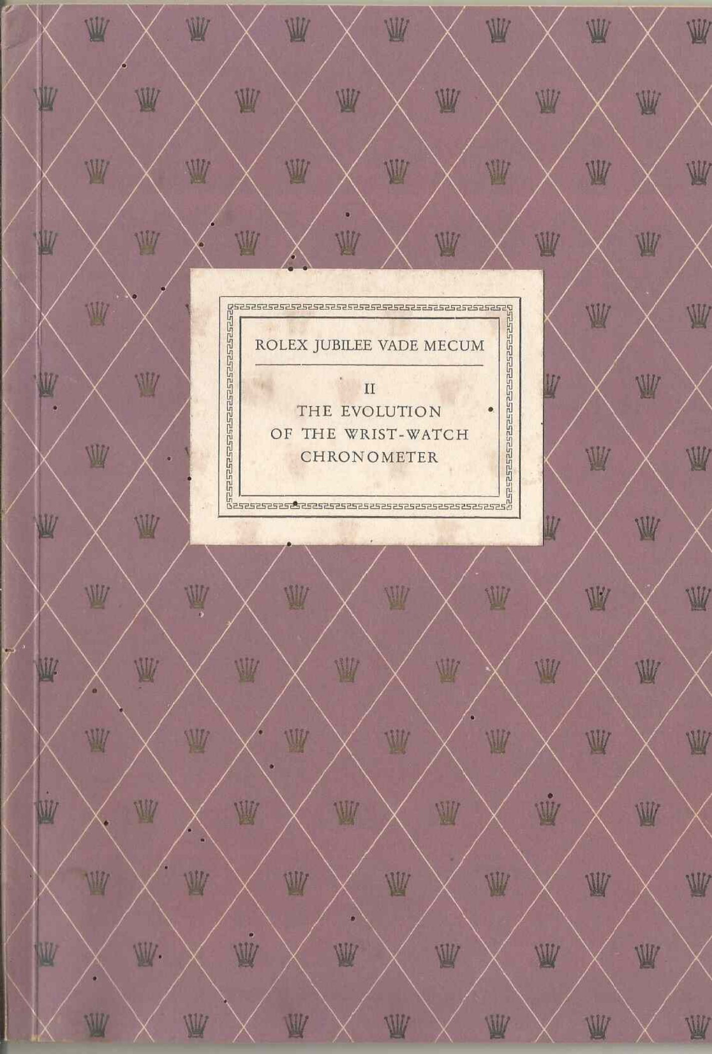

ROLEX JUBILEE VADE MECUM

II

THE EVOLUTION OF THE WRIST-WATCH CHRONOMETER

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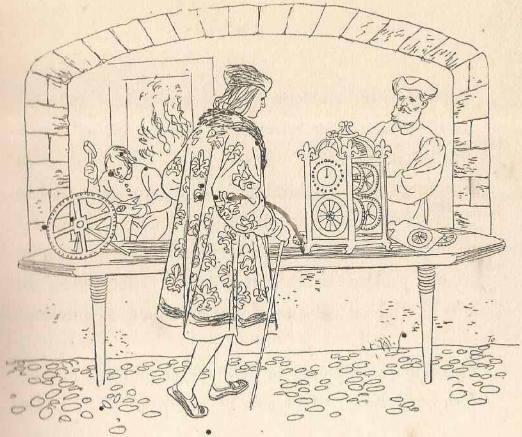


Among the world's major industries, that of watchmaking is doubtless the most highly evolved. The watch has been the object of constant research in several countries for four and a half centuries and it can now be considered as one of the greatest masterpieces created by human skill and toil.

During the last forty years remarkable progress has been achieved, particularly in the most difficult branch of the industry, the manufacture of the precision watch. In this field, the simple, empirical methods practised in the workshops of early horologists have been completed and perfected by the minute, scientific research carried on in modern laboratories.

The progress accomplished in the domain of chronometry has required from executives—in addition to practical, scientific experimentation—a great faculty of intuition, a grasp of problems which arise daily and of those likely to arise as a logical outcome of ever more intricate mechanisms.

This intuitive approach to the difficult problems of modern watchmaking has been the great merit of Mr. H. Wilsdorf, Governing Director of the Rolex Watch Co. Ltd., who, from the earliest days of his career in the watch industry, anticipated the present evolution of the watch and its modern form and technique.

Despite the improvements brought to the pocket watch in the early years of the present century, in 1905 Mr. Wilsdorf had already realized what a brilliant future lay before the wristlet watch, one might almost say to the exclusion of all other types of watches. He was one of the first to launch a nation-wide campaign in favour of this novelty—as it was then—in England and, later, on world markets.

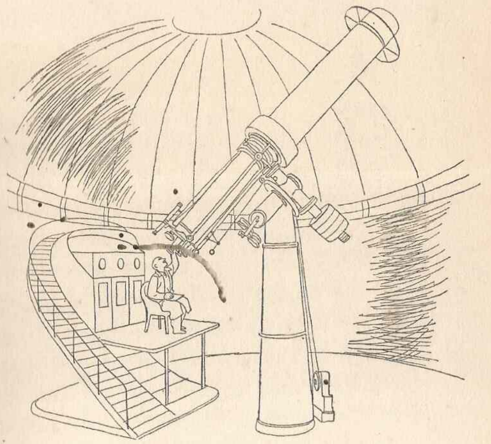
At the same time, Mr. Wilsdorf also foresaw the revolution in watch technique which would be brought about by this new fashion.

However, the wrist watch could only survive commercially if manufacturers succeeded in making it strong and resistant, because it is by its very nature infinitely more exposed to damage than the pocket watch or the fob, necklace and lapel watches which at one time were very popular. From the outset, the firm of Rolex followed an aim which at first appeared ideal but impractical: to make of the wrist watch a high precision instrument, to perfect it to such a degree that it would be, in effect, a chronometer. Mr. Wilsdorf's reasoning was extremely sound. He based his argument on the premise that the magnificent results obtained by chronometers during Observatory tests would have only a relative value, unless standard and current manufacture benefited thereby. He therefore set about realizing this great ambition with the co-operation of the excellent technical staff of the Rolex Factory at Bienne.

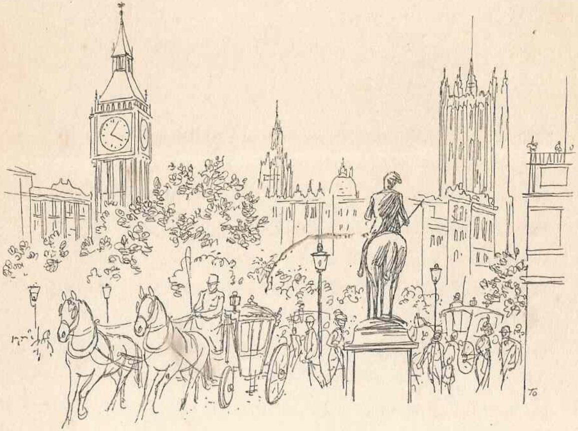
Nevertheless, in Switzerland as abroad, many technicians believed that the wristlet watch could never prove satisfactory as a precision watch, because it was necessarily exposed to the danger of abrupt gestures, shocks, dust and humidity.

These inconveniences were indeed real enough, but they had to be eliminated. Desperate ills need desperate remedies—and Rolex's, having devoted themselves wholeheartedly and with admirable assurance to the manufacture of wristlet watches, were able to find such remedies.

Mr. H. Wilsdorf in particular had realized that the precision of a watch worn on the wrist cannot be long preserved unless the case affords really effective protection for the movement. He therefore quite naturally conceived the idea of trying to find a waterproof case which would



prevent the precision obtained from being neutralized. Once this major invention had materialized, it became the firm and solid foundation on which the whole of Rolex manufacture was erected. Indeed, success soon crowned these efforts. As soon as the wristlet watch appeared on the market, even though it was considered as a novelty at the time, the Bienne factory had created a small lever escapement; then, during the years 1905—1908, Mr. Wilsdorf conceived more than 200 designs, some of which were long considered as classical, standard models. Soon, sensational results were being inscribed in the Golden Book of Rolex victories.



Everyone knows that, apart from the Observatories at Neuchâtel and Geneva, Official Controlment Offices for the Rating of Watches or Testing Stations have been foundet at Bienne, La Chaux-de-Fonds, Le Locle, St. Imier and Le Sentier, which are centres of the Swiss watchmaking industry. In these Stations, watches are submitted to different tests whereby their exact working can be checked and recorded.

On March 22nd 1910, an extremely interesting result was obtained at the Bienne Rating Office for *the first Rolex wrist-watch chronometer*, which was awarded a 1st Class Certificate (11″ round, 25 mm).

Four years later, in 1914, came another success, this time at Kew: the first Class "A" Certificate ever awarded by an Observatory for a *wristlet* chronometer (11″ round, 25 mm). This watch had been submitted to the five position and three temperature tests over a period of 45 days. Despite its size, it had thus undergone the same trials as any large marine chronometer[1].

Technically speaking, this success gave sufficient proof that very small movements could be real chronometers and that being so, Rolex's decided that all their calibers should pass the tests for precision watches. On June 14th 1925, Rolex obtained—also at the Kew Observatory—the first Class "A" Certificate ever awarded for so small a chronometer ($5^{3}/_{4}$″ oval, 13 × 23 mm). This remarkable feat was announced in the annual report of the Observatory in the following terms:

"It is of interest to note that a 'Class A' Certificate has been awarded to the Rolex Watch Co., Geneva, for a small oval wristlet watch, measuring $9^{3}/_{4} \times 5^{3}/_{4}$ lines

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[1] The five position tests are the following: vertical, crown up; crown to the left; crown to the right; flat, dial up; flat, back up. The three temperature tests are: ambient (about 18° C); cold, in the refrigerator; hot, in the oven.

(22 × 13 mm). This is the smallest movement which has received a 'Class A' Certificate at the Laboratory in recent years."

Thus, as early as 1925, Rolex was testifying to the fact that a very small ladies' watch can be endowed with the qualities of a *chronometer*.

Two years later, on March 16th 1927, again at Kew, another chronometer attracted great attention. It was commented on as follows in the Observatory's annual report:

"Another noteworthy result this year has been the award of a 'Class A, especially good' certificate for the $10^{3}/_{4} \times 6^{3}/_{4}$ lines (24 × 15 mm) rectangular bracelet watch sent by Messrs. Rolex Watch Co., Bienne, which gained a total of 86.5 marks."

On the following day, a round $10^{1}/_{2}''$ (23.5 mm) chronometer also carried off a Class "A" Certificate.

On May 31st 1928, a small $6^{3}/_{4}''$ Rolex Chronometer (24 × 15 mm) won the first 1st Class Certificate awarded by the Geneva Observatory for a watch of this size. This model triumphantly passed all the tests usually applied to *pocket* chronometers. The regulations in force at the time did not allow for the testing of small wrist-watch movements as a class apart.

On the very same day—it almost seemed as if the synchronization of the two events was pre-arranged—the first Class "A" Certificate for a round $8^{3}/_{4}''$ (21.7 mm) chronometer was awarded to a Rolex entry at Kew.

In 1929, at the Neuchâtel Observatory, Rolex received another 1st Class Certificate for the first rectangular $6^{3}/_{4}''$ chronometer.

Then, in 1932, the same $6^{3}/_{4}''$ movement carried off the first 1st Class Certificate issued by the Besançon Observatory (France) for this class.

It must be noted that Rolex are the only manufacturers who have obtained a 1st Class Certificate from the four Observatories of Kew, Geneva, Neuchâtel and Besançon for such a small, wrist-watch chronometer.

In 1934, the first "A" Certificate awarded at Kew for an ultra-thin, 16½″ chronometer, having a thickness of 2.8 mm again bore the name of Rolex. One year later, the Neuchâtel Observatory also granted an "A" Certificate to the same movement.

This was splendid work, but Rolex's had long been aiming at yet another objective, namely, *the regular serial manufacture* of wrist-watch chronometers.

The point can best be illustrated by a simile. A race horse which carries off a number of prizes is of value only if it serves the general development of its kind, that is to say, if it is used on a stud farm for breeding and training. The same can be said of a watch; in this field, too, only continuity and quantity of output can prove the worth of a specially constructed prototype.

This then was the Rolex policy.

On the occasion of King George V's Silver Jubilee, a large order was received from London. After April 29th 1936, within exactly 146 days after the booking of the order, 500 Rolex chronometers numbered 501 to 1000 ("Prince" caliber) all obtained a Rating Certificate

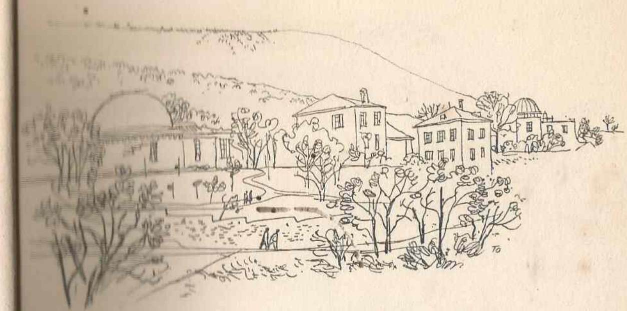
bearing the mention "specially good" (spécialement bon) from the Bienne Testing Station.

This feat proved conclusively that it is possible to proceed with the serial manufacture of wrist-watch chronometers, even at short notice.

The rhythm of output increased and, in 1945, the Rolex Factory obtained from the Bienne Testing Station its 50,000th Rating Certificate for *wristlet* watches. Our readers will understand that this can be considered as a sensational event, a summit in the history of a firm which can pride itself on yet many other splendid achievements. Let us add that this 50,000th wrist-watch chronometer has become the property of an eminent Swiss personality and could not have been placed in better hands.

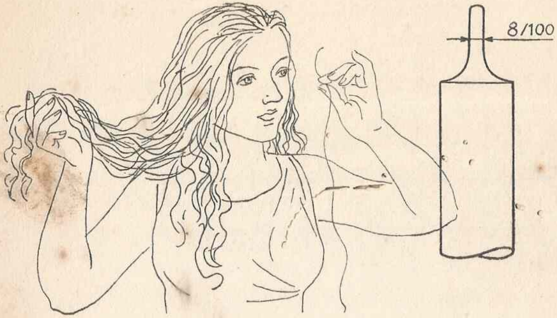
The serial manufacture of wristlet chronometers has not, however, prevented Rolex's from winning other distinctions in Observatory contests. Two brilliant performances of the kind are particularly worthy of mention.

On December 15th 1936, at Kew, a movement of the "Prince" type won an "A" Certificate *with the mention "specially good"*; it had obtained 87.6 points. Up to 1939, this remained *the best result on record* for a wristlet chronometer of *any caliber.* From 1914 to 1939, that is to say, over a period of 25 years, all Rolex calibers for wrist wear were classed among the first in the world at the Kew Observatory.



Still more remarkable, however, were the 9.65 points gained by a round, 12½″ chronometer (28.5 mm) on August 31st 1942 at the Neuchâtel Observatory. This 1st Class Certificate recorded *the best result* ever obtained up to that date by a wrist-watch chronometer of less than 30 mm Diameter. This Rolex success remained unsurpassed at the end of the three following years, 1942, 1943, 1944.

During the period 1927 to 1944, the different Swiss Testing Stations issued in all 54,799 Rating Certificates. By the end of 1944, Rolex's alone had obtained 48,347 Certificates.

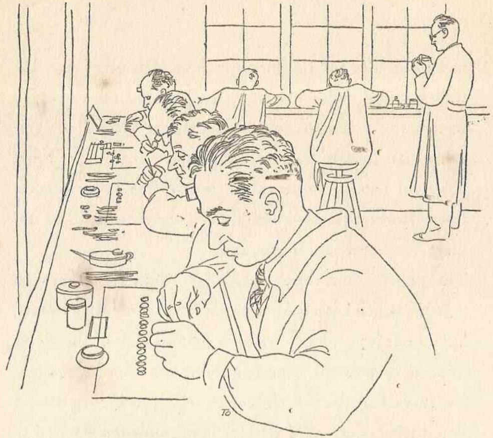


How has it been possible for one factory alone to achieve so much? Perhaps our readers will find an explanation in the following lines.

Let us consider, for instance, the adjustment of the balance-wheel pivots, an extremely important factor in the timing of a watch, as this organ bears directly on the regulator. For a watch the size of the Rolex "Perpetual", the thickness of a pivot of this kind is 8 hundredths of a millimetre. Compare this with a human hair, which is 6 hundredths of a millimetre thick. The balance-staffs are cut mechanically in specialized factories. Despite the precision that can be obtained with modern machines, it is difficult to turn out an absolutely perfect piece; all flaws must be removed

in the course of the finishing processes. The pivot must be well rounded, without scratch or blemish, otherwise the watch would run irregularly. Now, the type of magnifying glass usually used by watchmakers is far from being powerful enough to reveal these invisible imperfections. Every Rolex balance-wheel pivot is therefore checked under a very powerful microscope.

The patient observations made by Rolex technicians on watches which have been working for 2, 5 or even 30 years, have made it possible to establish that the ends of the pivots invariably show the same signs of wear. In order to obviate all risk of the pivot becoming deformed, even after a long period, very hard steel of impeccable quality had to be found, which would at the same time allow for a perfect polish. It was a long time before specialists would accept to cut and work these steels which, they discovered, wore down their cutters. Moreover, the quality of the steels supplied had first to be controlled and their content of other necessary alloys carefully checked. The presence of these properties can be noted fairly quickly by comparison and also by the spark produced during the grinding process; every steel alloy gives off sparks different both in shape and colour. Other more scientific tests are also applied.

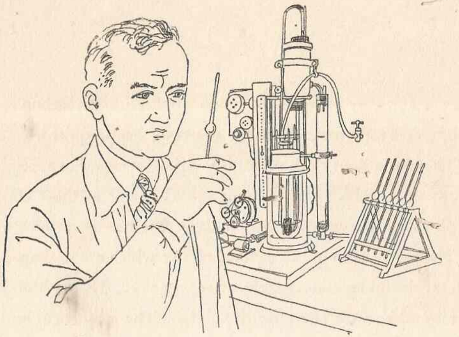


The tempering of the balance pivots, a necessary hardening process, is a delicate operation, for it must be remembered that the extremities of these parts are less than one-tenth of a millimetre thick. If a certain degree of heat is exceeded, the pivots are "burnt". Rolex pivots are tempered in an electric oven by the so-called "Curie point" process. When steel is heated to a certain temperature, at a given moment its magnetic properties are neutralized; this critical moment is propitious to the hardening process. The method

calls for very delicate, precision apparatus. Annealing is operated automatically at the degree of heat required.

The hardness of these pivots is verified by means of special apparatus which are, in miniature, the same as those employed in heavy industries for large engineering products. The pivots turn in rubies, the holes of which are so shaped that the oil remains exactly where required. The endstone, also ruby, must be perfectly polished. The ruby is cut and polished with diamond powder, but however fine this powder may be, it produces invisible scratches which can only be seen under a lens magnifying 50 times; fine as they were, Rolex discovered that even these scratches had to be eliminated so as to ensure the highest precision. As the jewellers could not obtain sufficiently good results to satisfy Rolex technicians, the latter set about experimenting on their own and finally discovered a method whereby jewels can be polished without being scratched at all.

The endstone must be absolutely perpendicular to the balance-staff if the oil is to remain in the required spot. The capillarity of the oil is in itself an important factor. All liquids are naturally attracted to an angle. Now, in watchmaking, the angle between the endstone and the jewel must be so calculated that the oil will remain exactly

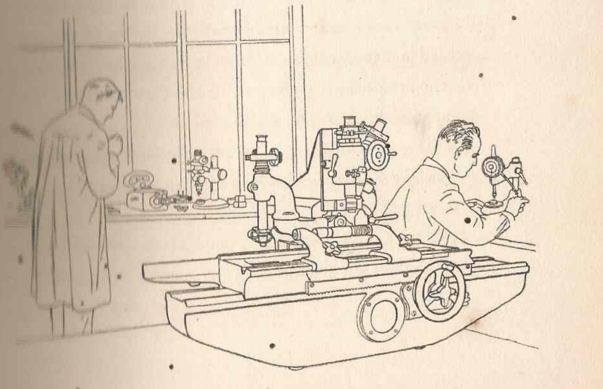


at the extremity of the pivot. Rolex technicians have found and patented a certain method of constructing the jewel whereby the oil is retained exactly in the spot required.

However, all these precautions have but little effect, if the oil employed dries, thickens or evaporates. The problem of the oils to be used in watchmaking is a most delicate one, as specialists well know. Rolex technicians therefore found that the question had to be faced and thoroughly studied; in fact, they were obliged to become chemists and compose an oil for their own use. A visit to the laboratory of the Rolex Factory will show what care is taken in dealing with this problem.

But again, good oils, perfectly cylindrical and well polished pivots and jewels would be of no avail if, during the

winding of the watch, particles of dust penetrated into the oil. The working of the pivot and the perfect cleanliness of all parts of the movement must be controlled while the watch is running. In order to verify if the pivots are in order, the endstones should be large and transparent, which is not usually the case. So here again, a microscope enlarging 10 times must be used, otherwise it would be impossible to see whether the oil remains absolutely pure; with such an instrument, the most minute particle of dust can be detected. To operate this control, the watch does not have to be taken to a special laboratory; every specialist in the factory, whether a workman or foreman, has a microscope beside him on his bench. After the watch has been wound,



it is therefore sent to the timing department and controlled. If the workman notices the slightest particle of dust in the oil, the watch is immediately taken to pieces again and thoroughly cleaned.

What we have said about the balance pivots also applies to every other part of the watch. The making of the whole watch is work of the highest precision; all processes of manufacture are closely interconnected, every part forms a link in the chain.

The watch springs are measured with super-sensitive dynamometers which register the exact resistance of the part in grammes; and any part which is not entirely satisfactory is set aside.

This then is the method whereby, with untiring attention to every detail and admirable patience, Rolex's have succeeded in manufacturing watches in such a way, that every chronometer which comes out of the factory can be accompanied by a Rating Certificate.

We have no hesitation in saying that only years of experience, the constant checking of each part and finished product and the elimination of all imperfections or of parts exceeding a very narrow accepted margin of tolerance, have allowed the firm of Rolex to achieve such magnificent results. Perseverance, the integrity of the technical executives in Bienne and Geneva, and the intelligence of a skilled staff, have found their reward in the accomplishment of great things.

The craftsman is known by his work.

ROLEX ROLL OF HONOUR

Autumn 1905 **London**

Nation-wide launching of the Rolex wristlet watch on the British market.

March 22nd 1910 **Official Controlment Office for the Rating of Watches, Bienne**

The 1st Rolex wrist-watch chronometer to be officially controlled obtains a 1st Class Certificate (11" round, 25 mm).

July 15th 1914 **Kew Observatory**

Rolex obtains *the first Class "A" Observatory Certificate ever awarded for a wrist-watch chronometer* (11" round, 25 mm), after testing for 45 days in 5 timing positions and 3 temperatures. This test is identical to that applied to large marine chronometers, no allowance being made for wrist-watch movements.

June 14th 1925 **Kew Observatory**

Rolex obtains *the first Class "A" Observatory Certificate ever awarded for so small a chronometer* (5¾" oval). The annual report of the Kew Observatory that year mentioned this feat in the following terms: "It is of interest to note that a 'Class A' Certificate has been awarded to the Rolex Watch Co., Geneva, for a small oval wristlet watch, measuring 9¾ × 5¾ lines (22 × 13 mm). This is the smallest movement which has received a 'Class A' Certificate at the Laboratory in recent years." By 1925, Rolex had therefore already proved that *a small ladies' watch* can be endowed with the properties of an extremely fine *chronometer*.

March 16th 1927 **Kew Observatory**

The first Class "A" Observatory Certificate ever awarded with the mention "specially good" for a 6¾" (24 × 15 mm) wrist-watch chronometer. This result was commented on as follows in the annual Kew report: "Another noteworthy result this year has been the award of a 'Class A, especially good' certificate for the 10¾ × 6¾ lines (24 × 15 mm) rectangular bracelet watch sent by Messrs. Rolex Watch Co., Bienne, which gained a total of 86.5 marks."

March 17th 1927 **Kew Observatory**

First "A" Certificate for a Rolex 10½" (round, 23.5 mm) chronometer.

May 31st 1928 **Geneva Observatory**

First 1st Class Certificate for 6¾" (24 × 15 mm) chronometer. Result obtained in the *marine* chronometer category (old ruling).

May 31st 1928 **Kew Observatory**

First "A" Certificate for a 8¾" chronometer (round, 21.7 mm).

March 11th 1929 **Neuchâtel Observatory**

First 1st Class Certificate for a 6¾" (24 × 15 mm) chronometer.

May 31st 1932 **Besançon Observatory**

First 1st Class Certificate for a 6¾" (24 × 15 mm) chronometer. *Rolex is the only factory to have obtained a 1st Class Certificate from the 4 Observatories of Kew, Geneva, Neuchâtel and Besançon for a small wristlet watch.*

June 23rd 1934 **Kew Observatory**

First "A" Certificate for a 16½", *ultra-flat* (2.8 mm) chronometer.

February 20th 1935 **Neuchâtel Observatory**

1st Class Certificate for a 16½", *ultra-flat* (2.8 mm) chronometer.

April 29th 1935 **Official Controlment Office for the Rating of Watches, Bienne**

500 Rolex chronometer numbered 501—1000 ("Prince" caliber) all obtain a Rating Certificate with mention "specially good". (These watches were specially manufactured for the occasion of King George V's Silver Jubilee). Rolex thus proves that the serial manufacture of wrist-watch *chronometers* is possible, even within a short, given period (146 days).

December 15th 1936 **Kew Observatory**

"A" Certificate for T.S. chronometer, "Prince" caliber, with mention "specially good": 87.6 points. *This remained the best result for wrist-watch chronometers of any size until 1939.*

August 31st 1941 **Neuchâtel Observatory**

1st Class Certificate for a round, 12½" (21.5 mm) chronometer: 9.83 points. *The best result ever recorded for a wrist-watch chronometer within the 30 mm class.* This success was maintained in 1942, 1943 and 1944.

January 5th 1945 **Official Controlment Office for the Rating of Watches, Bienne**

Rolex obtains its 50,000th Rating Certificate for wrist-watch chronometers, an event unique in the history of watchmaking.

Summer 1945* **Neuchâtel Observatory**

The 1944 Report of the Neuchâtel Observatory, published during the summer of 1945, contains the following passage (page 16): "*The chronometer which showed the smallest variation in the position test, ± 0.12, was one submitted by Rolex Watch Co., timed by Mr. Jean Maille of Evilard. Such a result has never before been recorded for a watch of this category. We congratulate Messrs. Rolex who have specialized in the manufacture of the good wristlet chronometer.*"

Apart from this fine achievement, the same chronometer also registered the best "rate resuming" results with the remarkable record of 0.23 seconds. In order to appreciate this feat at its full worth, mention must be made of the fact that the rate-resuming for 39 other wristlet chronometers awarded a Rating Certificate varied between *0.97 and 3.38 seconds.*

1000 numbered copies
of the Rolex Vade Mecum have been printed.

No. 217